8086 Microprocessor

Introduction to 8086 Microprocessor

- 8086 Microprocessor is an enhanced version of 8085 Microprocessor.
- It is a 16-bit Microprocessor.
- 8086 has a 20-bit address bus can access upto 2^20 (1 MB) memory locations and 16-bit data lines.
- It can support upto 64K I/O ports.
- It provides 14, 16-bit registers.
- It consists of powerful instruction set, which provides operations like multiplication and division easily.
- It supports two modes of operations, i.e. Maximum mode and Minimum mode. Maximum mode is suitable for system having multiple processors and Minimum mode is suitable for system having single processor.

Features of 8086

The most prominent features of a 8086 Microprocessor are as follows –

- It has an instruction queue, which is capable of storing 6 instruction bytes from the memory resulting in faster processing.
- It was the first 16-bit processor having 16-bit ALU, 16-bit registers, internal data bus, and 16-bit external data bus resulting in faster processing.

Features of 8086 (Cont.)

- It is available in 3 versions based on the frequency of operation
  - 8086 ⟶ 5 MHz
  - 8086-2 ⟶ 8 MHz
  - (c) 8086-1 ⟶ 10 MHz
- It uses two stages of pipelining, i.e. Fetch Stage and Execute Stage, which improves performance.
- It has multiplexed address and data bus AD_0 – AD_{15} and A_{16} – A_{19}.

Features of 8086 (Cont.)

- It requires single phase clock with 33% duty cycle to provide internal timing.
- It can prefetches upto 6 instruction bytes from memory and queues them in order to speed up instruction execution.
- Execute stage executes these instructions.
- It has 256 vectored interrupts.
- It consists of 29,000 transistors.
- It requires +5V power supply.
- A 40-pin dual in line package.

Comparison between 8085 and 8086 Microprocessor

- **Size** – 8085 is 8-bit Microprocessor, whereas 8086 is 16-bit Microprocessor.
- **Address bus** – 8085 has 16-bit address bus while 8086 has 20-bit address bus.
- **Memory** – 8085 can access up to 64 KB, whereas 8086 can access up to 1 MB of memory.
- **Instruction queue** – 8085 doesn't have an instruction queue, whereas 8086 has an instruction queue.
- **Pipelining** – 8085 doesn't support a pipelined architecture while 8086 supports a pipelined architecture.
- **I/O** – 8085 can access 2^8=256 I/O's, whereas 8086 can access 2^16=65,536 I/O's.
- **Cost** – The cost of 8085 is low whereas that of 8086 is high.